DOCUMENT RESUME

ED 133 140 SE 020 874

TITLE	Outdoor Education - A Guide to Site Planning and Implementation of Programs.
INSTITUTION	Texas Education Agency, Austin. Div. of Curriculum Development.
REPORT NO	TEA-BULL-763
PUB DATE	76
NOTE	72p.
AVAILABLE FROM	Texas Education Agency, Division of Curriculum Development, 201 East Eleventh Street, Austin, Texas 78701 ($2.00)
EDRS PRICE	MF-$0.83 HC-$3.50 Plus Postage.
DESCRIPTORS	*Elementary Secondary Education; *Environmental Education; *Facilities; Instruction; *Objectives; *Outdoor Education; *Program Development

ABSTRACT

This booklet presents guidelines for initiating outdoor instructional programs. Initially, the guide lists the objectives of outdoor education: survival, recreation, development of personal health and well-being, career opportunities, and social adjustment. A discussion follows on the three phases of site planning. The first phase is site analysis which involves research in topography, ecology, and land uses and control. The second phase encompasses program development which includes the statement of purpose and objectives, the role of the school site, and analysis of these roles for program development. The final phase concerns site design or a graphic representation combining site analysis and program development. The booklet also contains examples of school sites, a checklist for developing a program, guidelines for planning activities in all curricular areas, suggested learning experiences in each discipline, and resource and reference lists. (BR)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED133140

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Outdoor Education-A Guide to Site Planning and Implementation of Programs

SE 020 814

Outdoor Education- A Guide to Site Planning and Implementation of Programs

After the original free distribution, additional copies may be purchased for $2.00; however, with the increasing demand for educational material, the supply at times may be exhausted.

Since Texas Education Agency publications are not copyrighted, any or all sections of this bulletin may be duplicated.

Official distribution of Agency bulletins to the offices of school district and county superintendents is made as property of those offices and is not to be considered as personal property of the individual who receives them.

Division of Curriculum Development
Texas Education Agency
201 East Eleventh Street
Austin, Texas 78701

COMPLIANCE WITH TITLE VI, CIVIL RIGHTS ACT OF 1964 AND THE MODIFIED COURT ORDER, CIVIL ACTION 5281, FEDERAL DISTRICT COURT, EASTERN DISTRICT OF TEXAS, TYLER DIVISION

Reviews of local education agencies pertaining to compliance with Title VI Civil Rights Act of 1964 and with specific requirements of the Modified Court Order, Civil Action No. 5281, Federal District Court, Eastern District of Texas, Tyler Division are conducted periodically by staff representatives of the Texas Education Agency. These reviews cover at least the following policies and practices:

(1) acceptance policies on student transfers from other school districts;

(2) operation of school bus routes or runs on a non-segregated basis;

(3) non-discrimination in extracurricular activities and the use of school facilities;

(4) non-discriminatory practices in the hiring, assigning, promoting, paying, demoting, reassigning or dismissing of faculty and staff members who work with children;

(5) enrollment and assignment of students without discrimination on the ground of race, color or national origin;

(6) non-discriminatory practices relating to the use of a student's first language; and

(7) evidence of published procedures for hearing complaints and grievances.

In addition to conducting reviews, the Texas Education Agency staff representatives check complaints of discrimination made by a citizen or citizens residing in a school district where it is alleged discriminatory practices have or are occurring.

Where a violation of Title VI of the Civil Rights Act is found, the findings are reported to the Office for Civil Rights, Department of Health, Education and Welfare.

If there be a direct violation of the Court Order in Civil Action No. 5281 that cannot be cleared through negotiation, the sanctions required by the Court Order are applied.

Every child should have mud pies, grasshoppers, water-bugs, tadpoles, frogs, mud turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade in, water lilies, woodchucks, bats, bees, butter-flies, various animals to pet, hay fields, pine cones, rocks to roll, sand, snakes, huckleberries, and hornets, and any child who has been deprived of these has been deprived of the best part of his education.

- Luther Burbank

TEXAS EDUCATION AGENCY

STATE BOARD OF EDUCATION
(State Board for Vocational Education)

WM. L. BAGBY, Arlington
VERNON BAIRD, Fort Worth
WOODROW W. BEAN, El Paso
JAMES M. BINION, Abilene
MRS. CHARLSIE BOLTON, Kirbyville
JOE KELLY BUTLER, Houston
W. W. CARTER, Amarillo
DON H. COOK, D.D.S., Mesquite
JIMMY L. ELROD, San Antonio
W. H. FETTER, La Marque
JOSEPH C. GATHE, M.D., Houston
E. R. GREGG, Jr., Jacksonville
GEORGE C. GUTHRIE, San Antonio
JESSE HERRERA, San Antonio
RUBEN E. HINOJOSA, Mercedes
E. M. HUGGINS, Jr., Fulshear
DR. WILLIAM N. KEMP, Houston
MRS. MARY ANN LEVERIDGE, East Bernard
PAUL MATHEWS, Greenville
DR. STANLEY B. McCALEB, Richardson
GLEN L. SMITH, Waco
MRS. RONALD SMITH, Fort Worth
MRS. JANE H. WELLS, Austin
JAMES H. WHITESIDE, Lubbock

M. L. BROCKETTE, Commissioner of Education
(Executive Officer of the State Board of Education)

L. HARLAN FORD, Deputy Commissioner
for Programs and Personnel Development

ALTON O. BOWEN, Deputy Commissioner
for Administrative Services

Dorothy Davidson, Associate Commissioner for General Education

Leroy F. Psencik, Director, Division of Curriculum Development

C. S. (Bill) Story, Program Director
for Science

Joseph J. Huckestein, Conservation
& Environmental Education Consultant

B. T. Slater, Consultant
in Science

FOREWORD

Outdoor Education: A Guide to Site Planning and Implementation of Programs is designed to assist administrators, teachers, and communities in initiating outdoor instructional programs. Public school, education service center, college/university, and public and private agency representatives cooperated in the production of this guide.

We hope the suggestions in the guide will encourage schools and communities to provide opportunities for students to learn from the world beyond the classroom.

M. L. Brockette
Commissioner of Education

ACKNOWLEDGEMENTS

Writing Committee

Audean Allman
School of Education
Texas Southern University, Houston

Jim Connally
Tyler Independent School District
Camp Tyler, Tyler

Delmar Janke
College of Education
Department of Educational Curriculum
and Instruction
Texas A&M University, College Station

Ray Quinn
Department of Wildlife & Fisheries Science
Texas A&M University, College Station

James Milson
Department of Curriculum and Instruction
School of Education
The University of Texas at El Paso

Joseph Strehle
Division of Planning and Program Development
Region IV Education Service Center, Houston

Appreciation is extended to
Maine Environmental Education Project
for permission to incorporate portions
of the guide *The Community Environmental Inventory*.

Reviewers and Editors

Andy Anderson
Information & Education Director, Retired
Texas Forest Service
College Station

Jerry Anderson
Teacher Counselor
Tyler Independent School District

John W. Arnn
State Resource Conservationist
U. S. Department of Agriculture
Temple

Randy Beavers
Assistant to the Director of
Science Center
Spring Branch Independent School
District

Edith F. Bondi
Private Educational Consultant
Houston

Barbara Criss
Teacher-Counselor
Tyler Independent School District

Jim Dudley
Director of Outdoor Education
Tyler Independent School District

Johnny Griffigh
Teacher Counselor
Tyler Independent School District

John Haislet
Information & Education Director
Texas Forest Service
College Station

Ruth D. Hart
Professor, College of Education
Houston Baptist College

Marcile Hollingsworth
Science Consultant
Houston Independent School District

Ann Reed
Teacher Counselor
Tyler Independent School District

Glenn Shackelford, Jr.
Teacher Counselor
Tyler Independent School District

William C. Welch
Landscape Horticultist
Texas A&M University
College Station

The following schools reviewed the guide and/or established school sites using the tentative draft:

Edgewood Independent School District
Memorial High School
Gene Troy, Principal

Judson Independent School District
Coronado Village Elementary School
George Ammerman, Principal

Schertz-Cibolo-Universal City Independent School District
Schertz Elementary School
Billy Patterson, Principal

Floresville Independent School District
Floresville Junior High School
Maurice Westmoreland, Superintendent

CONTENTS

I. Rationale 1

II. Objectives of Outdoor Education 2

III. Program Model 3

IV. Site Planning 4

Site Analysis 5
Program Development 8
Site Design 11

V. Examples of School Sites in Texas 12

VI. Checklist for Developing an Outdoor School Site Program 20

VII. Developing Activities for Education 24

VIII. Outdoor Education Experiences 31

IX. Resources 53

X. School Districts Offering Outdoor Education 57

XI. Agencies Represented on Texas Advisory Committee on Conservation and Environmental Education 60

I. RATIONALE

Teachers and administrators of Texas public schools have expressed a need for a resource guide that would aid in developing school sites into outdoor learning laboratories providing effective learning experiences which could develop within each student an "environmental awareness and a sense of responsibility for the stewardship of the environment."

Within the past two generations, Texas' population has more than doubled and has dramatically changed from rural to urban. As a result of this change, citizens have greatly latered their surroundings thus creating many environmental problems within the biosphere. Pollution of the environment, poor land development, and the near extinctions of some plants and animals are but some of the pressing problems people have created. These problems relate very directly to the quality of life that exists and, therefore, must be addressed in the education program of Texas schools.

Each individual's attitude toward the productive use of the earth's resources will determine the quality of life a citizen can expect to have in the future. There is a pressing need for students to have direct experience with the array of resources which they will manage in the future. This experience must begin at an early age and is absolutely essential to shaping constructive attitudes toward the wise use of natural resources which they will best develop through direct involvement with management practices. Strategies must be developed which provide learning experiences for school children in a real life setting.

What better way to learn about the resources of the field, forest, and seacoast than to have an outdoor classroom in these natural settings? Learning activities should be structured around real objects and events which youngsters encounter in everyday life. Conservation can then become a part of life rather than only preparation for the "good life."

This guide offers suggestions for providing learning experiences in all curriculum areas in whatever natural settings are available to a school district. Such outdoor school sites should be laboratories for studies in ecology, environmental management, and natural history interpretation, as well as multipurpose recreational areas for the school and community.

II. OBJECTIVES OF OUTDOOR EDUCATION

1. Survival--Effective utilization of the natural products of a healthy environment (food, clothing, shelter, recreation)

2. Recreation--Creative utilization of supportive living resources

3. Development of personal health and well-being
   - . Healthful exercise
   - . Nutrition
   - . Mental health

4. Career opportunities
   - . Emphasis in elementary school
     - .. Awareness of wildlife and forest management occupations
     - .. Awareness of aesthetic environmental occupations such as those in horticulture and floriculture
   - . Middle school emphasis
     - .. Exploration of wildlife, forestry, and resource management occupations
     - ... Exploration of aesthetic occupations (horticulture and floriculture)
   - . High school emphasis
     - .. Skill development in wildlife, forestry, and resource management occupations
     - .. Skill development in aesthetic environmental occupations (horticulture, floriculture, and landscaping)

5. Social Adjustment
   - . Services to fellow humans in an environmental context
   - . Development of wholesome values in an environmental context
   - . Experience in making wise choices and decisions regarding environmental questions
   - . Fostering constructive attitudes toward "cooperative activity" through games, simulations, role playing

III. PROGRAM MODEL

A general model for outdoor education should meet the following specifications:

1. The program design should include learner activities designed to address each of the objectives.
2. Activities should utilize local and regional resources and be screened for relevancy and practical application in each geographic area of the state.
3. Adequate supportive instructional resources should be available.
4. Activities should be enjoyable.

IV. SITE PLANNING

Planning is the key to effective outdoor classroom design, development, and utilization, whether land is to be selected for new construction or whether facilities already exist. The professional whose training is most appropriate for this work is the landscape architect. Like other architects, professional landscape architects do design work only and are not involved in the nursery or planting business. They are most effective when engaged during the early stages of overall planning so that they can collaborate with architects and engineers in the total design effort. The finished plans and specifications make it possible to involve students, garden clubs, retired citizens, PTAs, and other civic groups in the construction of an outdoor learning area.

Whether new facilities are planned or old ones are to be improved, site planning involves three basic phases: (1) site analysis, (2) program development, and (3) site design.

Site Analysis

Site analysis involves an in-depth study of the site's character, an inventory of site factors, elements, or components which may influence or be influenced by the development of the site. The inventory process helps to minimize expenditures and developmental problems during the initial construction period and to maximize physical design capabilities, education, and aesthetic benefits after construction. The inventory data collected and evaluated during this phase should be compiled in the form of a schematic plan which is called the site analysis.

Program Development

How the site will be used should be determined before the site is developed. The demands and needs of the program should influence development of the site. Perhaps a particular activity may require certain physical components--water, rocks, or vegetation, for example--should be left; or perhaps certain ones should be removed. Often there are important site amenities on which the activities should focus, thus increasing the site's educational value and significance. Program development and site analysis, therefore, should proceed simultaneously, for one influences the other. Forcing an inflexible or predetermined program onto a site may produce less than satisfactory results. Thus, program development reveals site design considerations and implications which help to determine how the site should be altered to fit the purposes and how the roles should be modified to receive full advantage from the site.

Site Design

The third phase of planning, site design, is concerned with developing a schematic plan. It combines the site analysis phase and the program development phase into a broad conceptual framework. It is

not, at this point, a detailed blueprint.

The outdoor school site offers an opportunity for students, teachers, and parents to learn and to work in the areas of school site planning, development, and implementation in the ongoing process of environmental management. Such understandings can help each individual to appreciate the need for better environmental design in community development projects--design which will be more sensitive to people's physical, psychological, and social needs and which will, at the same time, reflect a greater compatability with the land and natural ecological processes.

Site Analysis Overview

Securing base maps. Topographic maps and aerial photographs are helpful in giving an overall picture of the regional and community characteristics. U.S. Geological Survey maps are not generally satisfactory for gathering or locating details on an area the size of a school site because of the relatively small scale of the maps. It is possible to obtain large-scale aerial photographs which do provide some detail. These are available from the local soil conservation field office.

A school blueprint showing the proposed site, building shapes, and other features is often included with the contractor's original set of prints used during the time the school was constructed. Site information may also be obtained from property maps or tax maps at the community office buildings or city hall.

The time invested in securing good base maps is well spent, for they help provide valuable information such as site boundaries, topography, building shapes and locations, swales and drainages, natural vegetation, and other important features. This kind of information makes the final analysis accurate and prevents wasting time on the site duplicating the efforts of others.

Topography and drainage. Land form and surface movement of water upon the land affect a wide variety of planning considerations and decisions. Circulation linkages and routes of travel can be constructed to take advantage of the shape of the land and thus provide greater comfort and value to the user. Analysis of the site's topography--its ridges and drainage pattern, flat areas, easy grades, and steep slopes--can help in the organization and physical arrangement of the site for development purposes. Consequently, the planner should keep in mind many site characteristics and features which are directly or indirectly related to topography and thus influence various site uses and activities. Among these are soil types, percent of slope, orientation to the sun, wind movement, cold air and frost pockets, temperature, susceptibility to erosion, pedestrian and vehicular circulation and separation, natural entrances and exits, acoustical properties, overall scale of the landscape, types and density of water runoff rate, water quantity and quality, aesthetic view, surface water habitats and system of linkage, aquifers, aquifer-recharge areas, landscape texture, light and shade values and patterns, land-use limitations, and other amenities or limitations imposed by topography and drainage.

Ecology of the site. During site analysis it is important to identify ecological characteristics. Ecology is the science which studies the interrelationships and interactions between organisms and their environ-

ment. In the natural environment, living organisms and nonliving components are constantly interacting upon each other. Exchanges of materials which take place between the living and nonliving parts follow complex circular pathways or cycles. It is important for people to recognize that these interactions are extremely vulnerable to outside disturbance and that, wherever or whenever these relationships are destroyed or altered, the level of quality of the environment may be decreased.

Generally speaking, the most stable and productive environments are those which have the greatest diversity of organisms, of habitats, and of successional stands. During school site analysis, it is important in assessing environmental quality to make comparisons between the population of any given species and the total number of species present. High quality is indicated not by the greatest number of a particular "kind" (of organism, habitat, or successional stage) but by the most "kinds" of:

Plants and animals--Grasses, shrubs, trees, insects, fish, birds, and other wildlife

Habitats--Forest, shrublands, grasslands/fields, dunes, wetlands

Successional stages--Primary, secondary, climax stages

In addition, significant or unique ecological factors should be noted, for example:

Local climatic conditions

Unique or superlative specimens of interest

Evidences of natural or people-made environmental influences (ecological problem areas)

Other important or unique factors related to land, air, water, plant, animal, and energy interrelationship on the site

Obviously, field observations such as these are only rough indicators of site quality. For use as an ecology laboratory, a site should receive much more intensive analysis. Such an analysis would normally be pursued in connection with the program of study and, in fact, would consist of a more or less continuous inventory.

Vegetation. Analysis of vegetation on the school site should be considered not only in relation to its ecological value but also in terms of its architectural, engineering, climatic control, and educational and aesthetic values.

Architectural value of vegetation includes its use in defining exterior space by forming walls, canopies, and floors; in screening out objectionable views; and in privacy control.

Engineering uses of vegetation include siltation and erosion control, acoustical controls, atmospheric controls, and reduction of glare and reflection. Vegetation can reduce objectionable noise by absorbing, deflecting, or defracting sound; it can help control atmospheric pollution by screening out atmospheric particulates and by absorbing carbon dioxide. Moreover, in urban areas especially, vegetation is being utilized effectively as barriers against exces-

sive glare and reflection from surfaces such as concrete and glass.

Vegetation also helps to modify and control climate. By acting as windbreaks, vegetation can effectively reduce wind velocity by 50 percent for 10 to 20 times the height of a planting.* It can control the micro-climate by intercepting precipitation, by holding soil moisture, and by providing cooling shade in the summer.

Natural and introduced vegetation can increase the aesthetic value of the site in many ways, including its variety, color, form, texture, fragrance, and contrast.

During a general site analysis, vegetation may be categorized in broad terms such as types or associations. Specific site purposes eventually require that a fairly complete vegetation inventory be compiled. An inventory which considers the ecological, economic, architectural, engineering, climate control, and aesthetic values of vegetation can help in effective development and utilization of the site. Developmental considerations might, for example, include leaving areas of a site in natural vegetative cover for ecological and functional reasons or introducing vegetation for any of the above named reasons.

---

*Kevin Lynch, *Site Planning* (Cambridge, Massachusetts: The M.I.T. Press, Massachusetts Institute of Technology, 1962).

Physical geology, soils, hydrology. These areas are directly influenced by the historical geology of the region as described in regional and community influences. One important aspect of school site analysis is, therefore, to gather physical evidence which will help to relate the geological, hydrological, and soil characteristics of the site to this regional influence.

Information about the soil can be obtained from the U.S. Agricultural Conservation Service. Rough field identification of soils can be made of the following major classes:

clean sands and gravels
silty and clayey sands and gravels
sandy and gravelly clays
inorganic silts and fine clays
organic silts
organic clays

A hydrology study would include identifying precipitation data and information about any surface water that affects the site.

Landscape character. In addition to the factors already discussed, site analysis should also address itself to evaluation of the site from a visual or aesthetic viewpoint. Often the most successful site development is that which results in the least disruption of the site.

Existing and proposed land uses and controls. An analysis of land uses as human activity areas should be concerned with the extent to which existing or proposed uses are affecting or may affect the site and the resulting influence on ecological and social conditions in that area. It is important, therefore,

that such effects be identified and evaluated to determine where such activities may be incompatible with natural conditions or where precautionary measures (policies or controls) could be created to minimize environmental problems.

Off-site characteristics and influences. The final area of consideration in site analysis concerns the examination of off-site characteristics which influence the site or which may be influenced by site development. Such considerations could include any of the previously discussed site analysis factors.

Summary. It is obvious that site analysis is concerned with all aspects of the site's surface and subsurface physical conditions. These include both natural and people-made environmental influences relating to ecological, economic, political, social, technological, and aesthetic point of view. It is important to recognize that site analysis, like community inventory, is performed at various levels of complexity and may, in fact, be a continuous process in view of the constant changes which occur within the natural and people-made environment.

Program Development Overview

Once the need for a particular kind of development or purpose has been recognized and broad objectives have been established, the particular purpose or use for that site can be determined. Developing a program to fit the site helps to create the greatest degree of compatibility between site and purpose. Compatability is reflected by functional design which results in the least destructive disturbance to the site.

The program, combined with site analysis, helps to answer four basic questions:

1. What unique qualities does the site have to offer to the development of the program and its specific roles?
2. What components need to be created (or modified) on the site?
3. What components need to be left on the site?
4. What components need to be removed from the site?

The answers to these questions are expressed graphically in site design, where the site and program are fitted together into a compatible working relationship.

The model on page 8 illustrates, in part, the process of program development.

Based on the model, program development might follow these steps:

Step 1: Statement of purpose and objectives. School sites can and should be planned and developed to provide greater benefits to the school and community. In addition to providing space for the physical plant, school sites should be selected, designed, and utilized in a manner which will

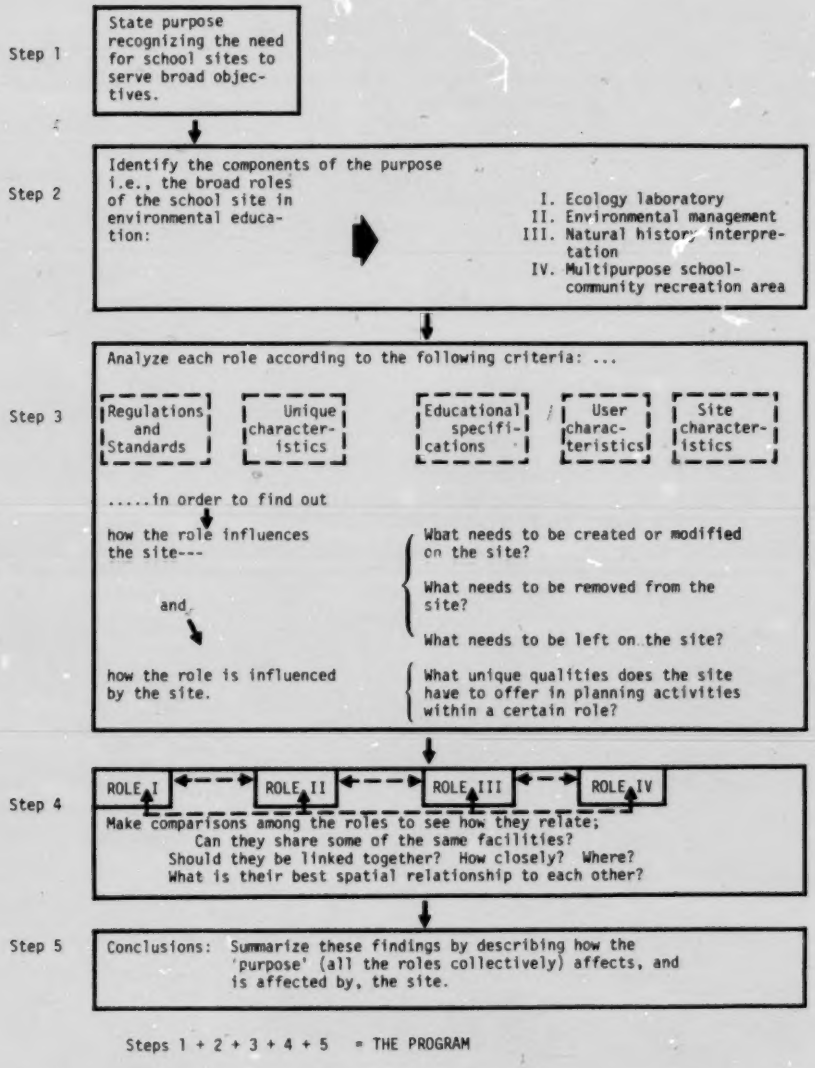
- serve to exemplify and promote a land use ethic to all citizens of the community;
- encourage community use of a community-owned resource;
- include broad instructional programs relevant to present and future social and environmental problems and needs;
- provide efficient and economic operation and maintenance of the physical plant through better control and management of environmental factors, such as modification of the climate through

plantings or orienting activities to take best advantage of climatic conditions.

Step 2: The role of the school site in outdoor education. The various roles of a school site in an outdoor education program can help to achieve the above objectives. These roles include serving as an ecology laboratory, an environmental management laboratory, a natural history interpretive area, and a multipurpose school-community recreation area.

Step 3: Analysis of these roles for program development. Five research areas are suggested to serve as criteria for analyzing each role. The information which results from this analysis should lead to specific site design considerations and implications. These in turn affect what will be created or modified on site, removed from the site, and left on the site.

Site Program Development Process Model


Step 1
State purpose recognizing the need for school sites to serve broad objectives.
Step 2
Identify the components of the purpose i.e., the broad roles of the school site in environmental education:
I. Ecology laboratory
II. Environmental management
III. Natural history interpretation
IV. Multipurpose school-community recreation area
Step 3
Analyze each role according to the following criteria: ...
Regulations and Standards
Unique characteristics
Educational specifications
User characteristics
Site characteristics
.....in order to find out
how the role influences the site---
What needs to be created or modified on the site?
What needs to be removed from the site?
What needs to be left on the site?
and
how the role is influenced by the site.
What unique qualities does the site have to offer in planning activities within a certain role?
Step 4
ROLE I
ROLE II
ROLE III
ROLE IV
Make comparisons among the roles to see how they relate;
Can they share some of the same facilities?
Should they be linked together? How closely? Where?
What is their best spatial relationship to each other?
Step 5
Conclusions: Summarize these findings by describing how the 'purpose' (all the roles collectively) affects, and is affected by, the site.

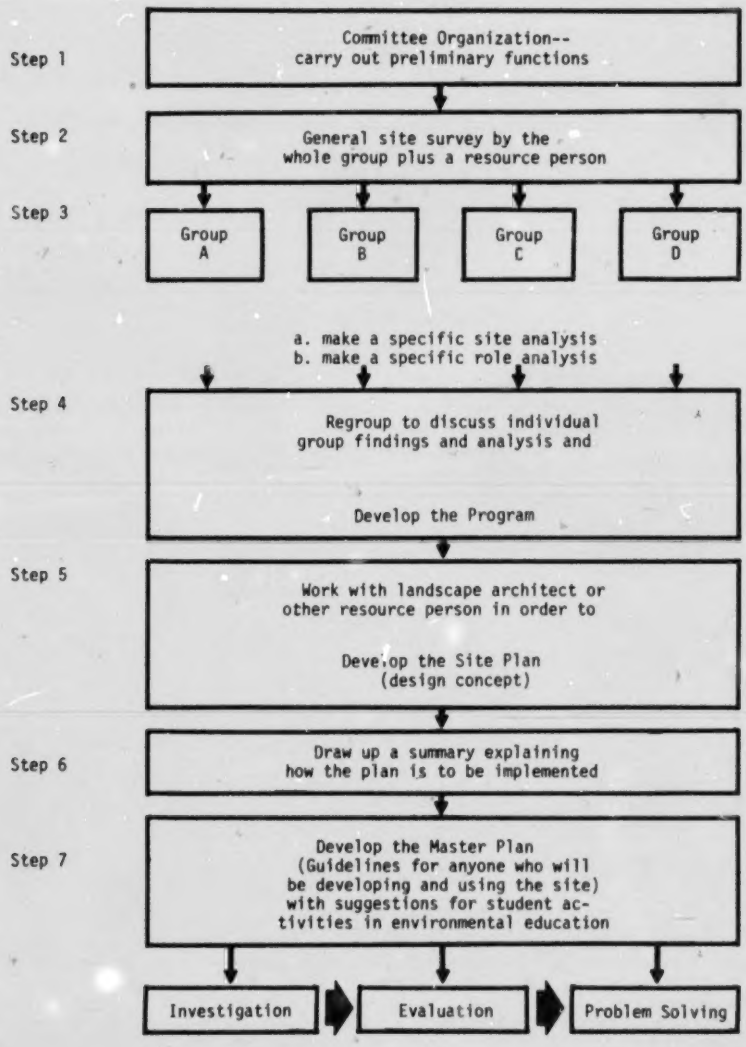
Steps 1 + 2 + 3 + 4 + 5 = THE PROGRAM

The School Site Development Committee. One way to initiate the planning, development, and utilization of an outdoor education school site is the formation of a school site development committee, which might include students, teachers, a school administrator, a member of the school board, interested citizens, and local resource people.

Obviously, a committee which represents many sectors of the community will generate more ideas for the design and utilization of the site. An additional benefit will result when the site is ready for use, because it is more likely to be supported and used by more citizens in the neighborhood if they are represented in its planning and development.

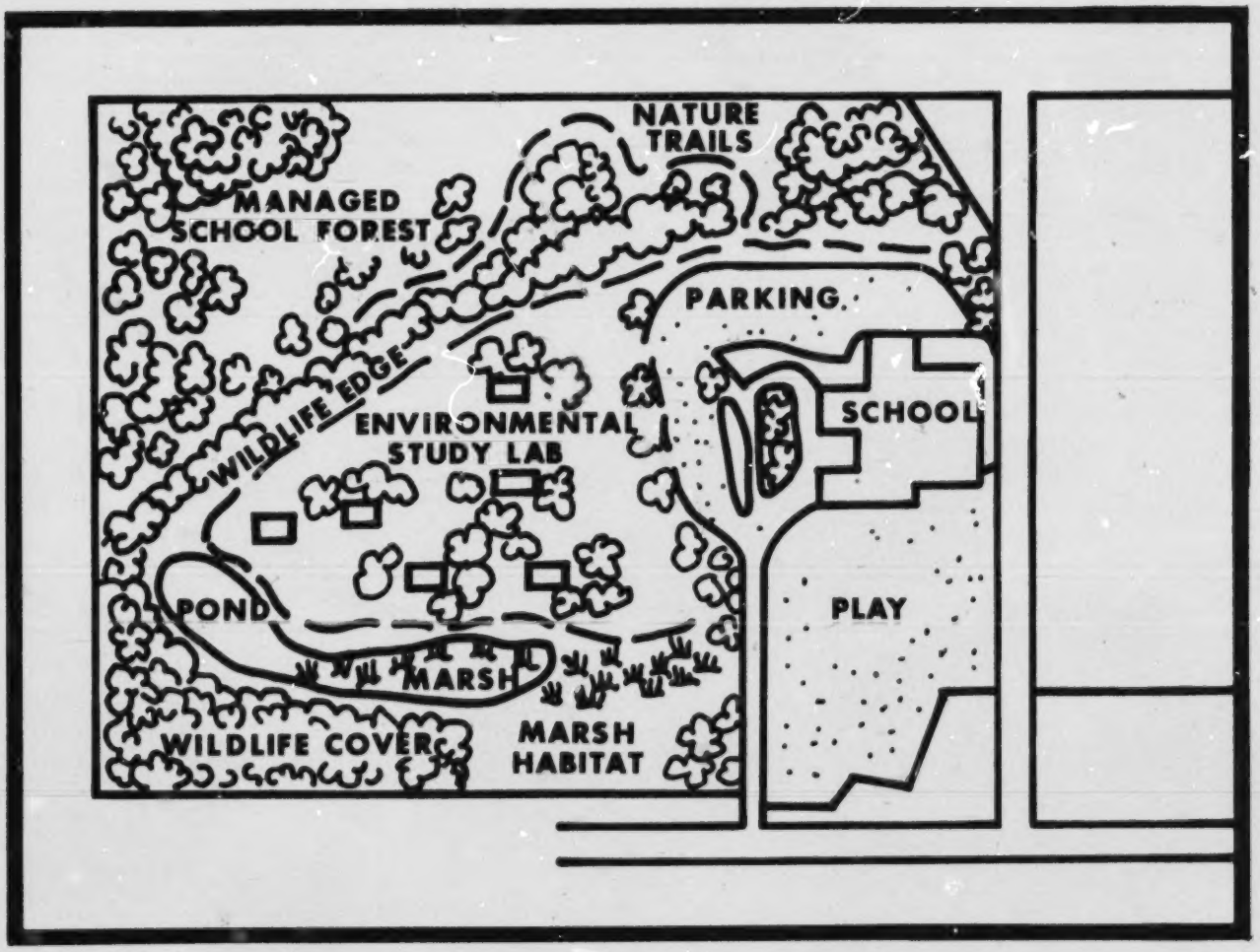
A model of the function of this committee is shown below.

MODEL ILLUSTRATING THE FUNCTIONS
OF THE SCHOOL SITE DEVELOPMENT COMMITTEE



Site Design Overview. The final phase in development of an outdoor site, site design, is the graphic interpretation of how the site and program should be blended. All data collected on the site analysis and program development should be reflected in the graphic site design.

SITE DESIGN



V. EXAMPLES OF SCHOOL SITES IN TEXAS

A few examples of school sites in use in Texas schools are described and illustrated on the following pages. The intention is to give a sampling of schools in all parts of the state which give a cross section of the type of sites that can be developed.

In some cases only one teacher and a few students are involved. In others the school administration, parent-teacher groups, the U. S. Agricultural Soil Conservation Service district representative, other agencies of state and federal government, and the whole school district have been involved.

Some school sites are developed with no special funds; thousands of dollars are spent on others. Several acres are available for some; a few square feet for others. Pre-schoolers to retired people are involved in the development of some sites; small student clubs in one grade may develop in others.

Many exemplary outdoor school sites are in use in Texas; however, those described here were selected from responses to a statewide questionnaire for variety of size, cooperating elements, and resources.

LUBBOCK INDEPENDENT SCHOOL DISTRICT

Maedgen Elementary School

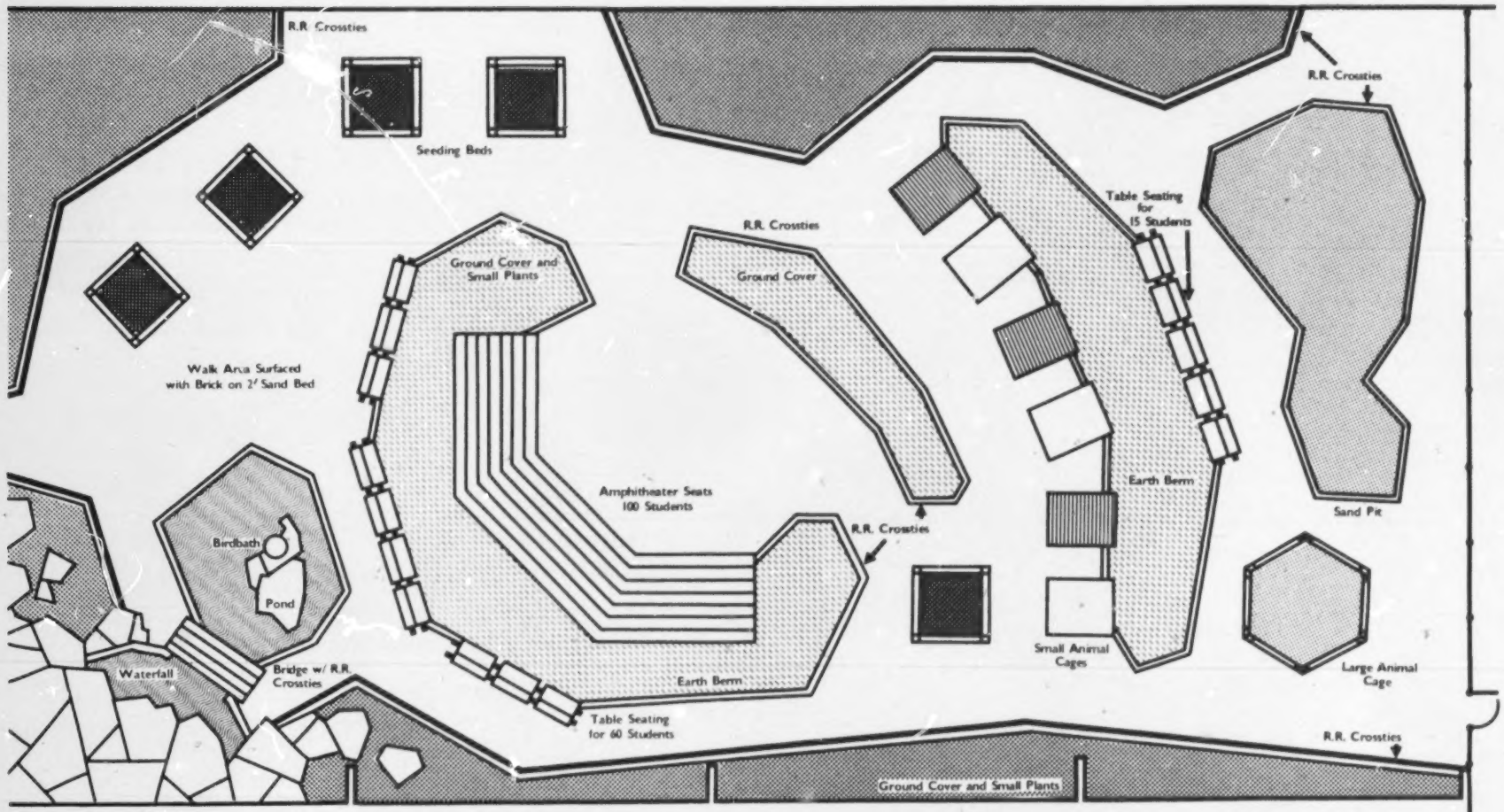
The Maedgen outdoor learning center is just a little larger than a basketball court, enclosed on three sides by Maedgen Elementary School.

The outdoor learning center consists of a waterfall, seeding beds, shade trees, amphitheater for 70 students, a small stage, cages for animals, and topographical sand pit.

Each class is responsible for planting a tree or shrub. Through subsequent seasons, the same groups will prune and care for their own plants. A wide variety of species will increase learning experiences. Cages will house those small animals who make chance appearances on show-and-tell days. Other sheltered cages will provide temporary homes for larger animals like calves and lambs.

The sand pit, like a giant salt map, may be designed and redesigned by students to resemble any region. Using their skills with crafts, students may construct appropriate architecture for that region. Or they may wish to cultivate it as a farm for one growing season.

The Maedgen outdoor learning center will change its appearance as often as the seasons.



SITE PLAN MAEDGEN ELEMENTARY SCHOOL North

TYLER INDEPENDENT SCHOOL DISTRICT

Camp Tyler

Since 1949 the Tyler public schools have carried on one of the nation's more comprehensive outdoor education programs. A school-community facility, Tyler's 300-acre camp has served as a center for this program.

Outdoor education is available to every fifth and sixth grade boy and girl in the elementary schools of Tyler. The fifth graders are in camp two days and one night. Sixth graders are in camp three days and two nights. The education actually begins a few weeks before the outdoor experience as teacher-pupil and camp staff planning takes shape, and continues after the actual camptime as the children and their teacher evaluate the experiences they had while at camp.

Camp Tyler has seven main objectives for youngsters in its program:

1. Developing self-reliance.
2. Developing the ability to get along with schoolmates.
3. Developing healthful living habits.
4. Increasing appreciation of nature and farming.
5. Developing awareness of the importance of conserving our natural resources, which provide food, clothing, and shelter.
6. Recognizing the importance of teamwork.
7. Having a wholesome good time that will be long remembered.

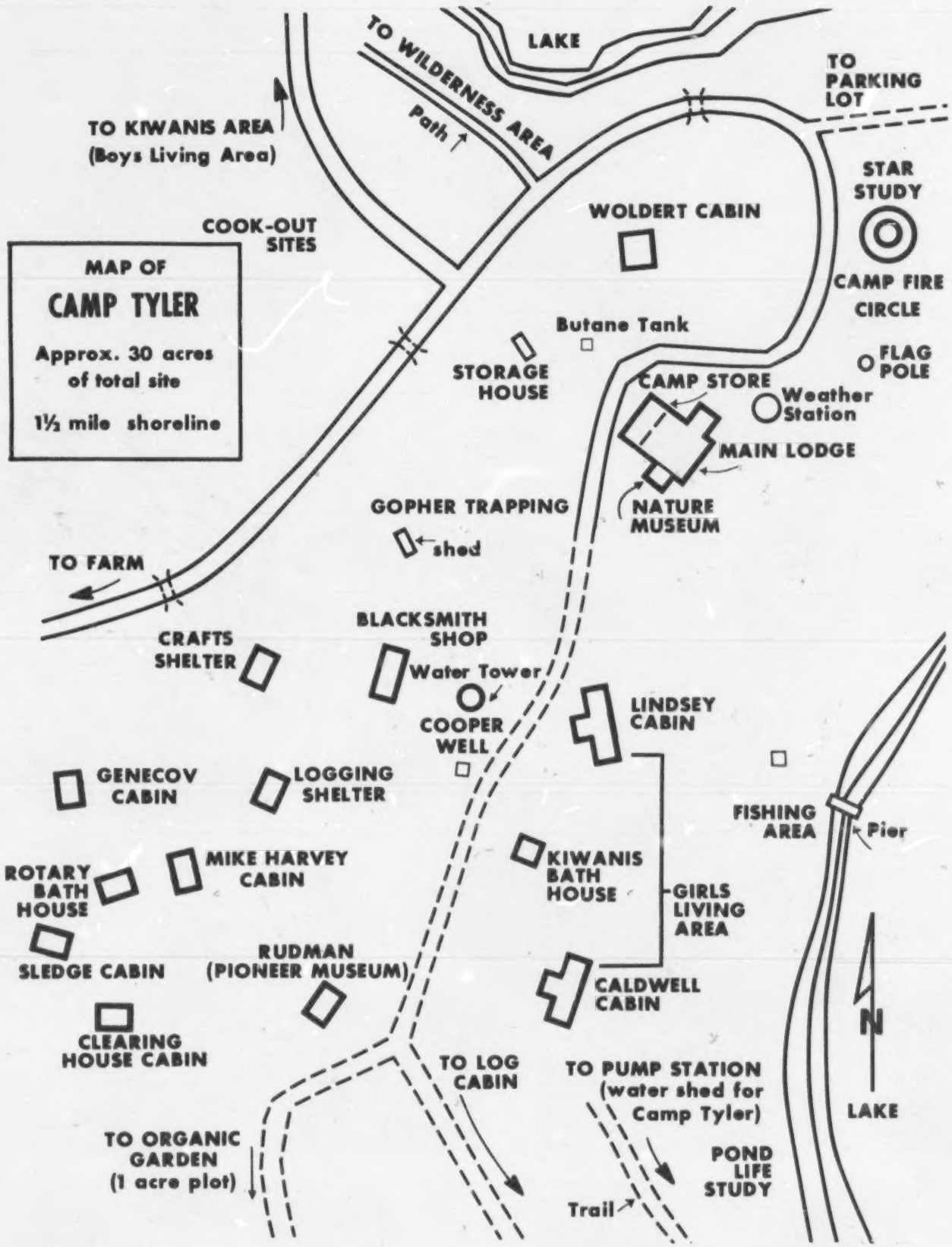
Along with Camp Tyler is a school farm. Children learn about and care for farm animals, observe good practices in land management, and develop appreciation for rural living. They feed the animals, gather eggs, and harvest vegetables and other field crops.

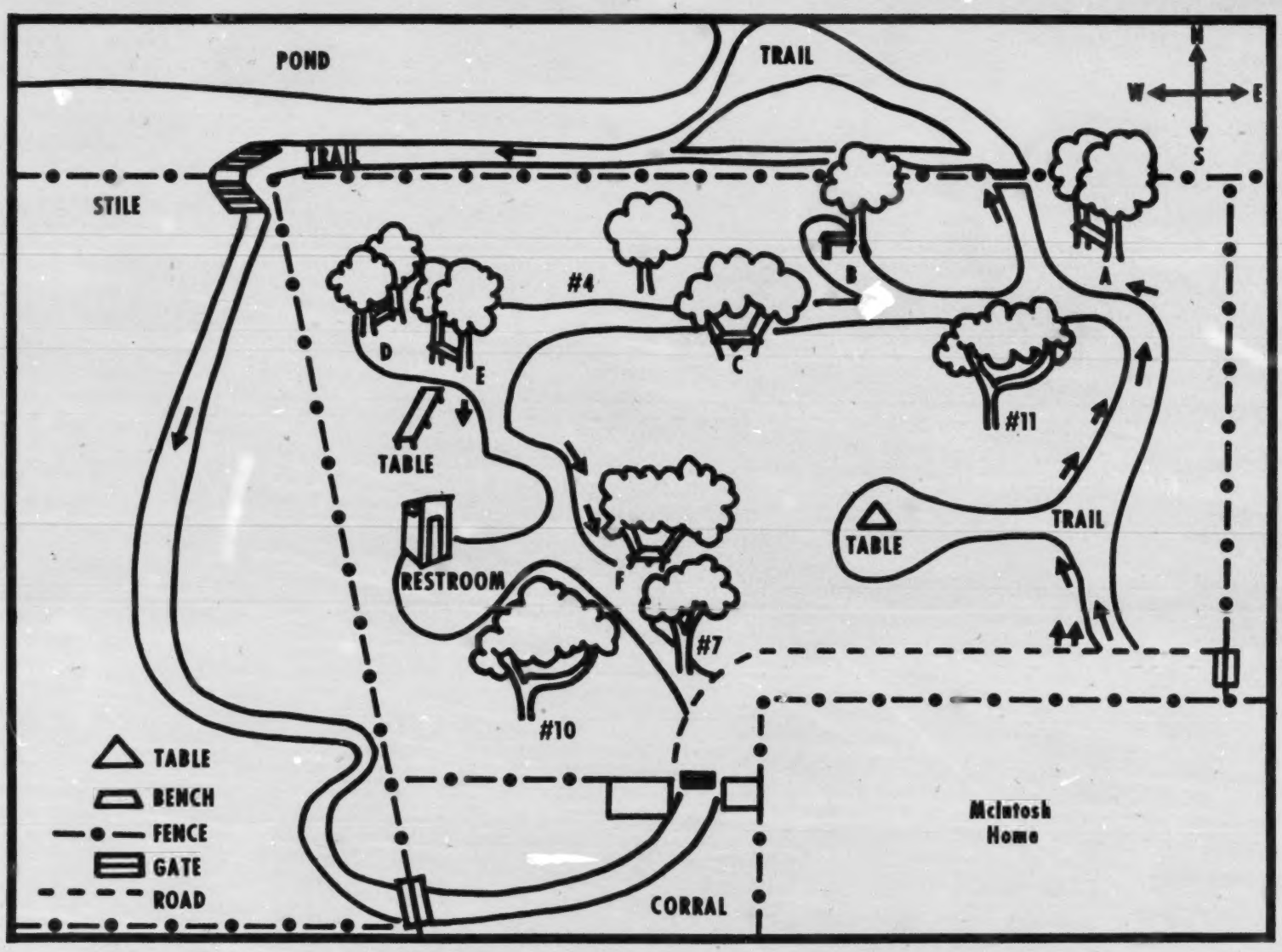
ALICE INDEPENDENT SCHOOL DISTRICT

Leo McIntosh Farm

This 20-acre tract of land is on the south banks of San Diego Creek. Mr. Leo McIntosh has offered the use of the property for the Alice Independent School District for field studies of the environment and ecology.

The community has become involved in the project through the interest of civic clubs, whose members have enlarged the trail and provided small tables, a stile, and a restroom.


MAP OF
CAMP TYLER
Approx. 30 acres of total site
1½ mile shoreline
LAKE
TO WILDERNESS AREA
Path
TO PARKING LOT
TO KIWANIS AREA (Boys Living Area)
STAR STUDY
WOLDERT CABIN
COOK-OUT SITES
CAMP FIRE CIRCLE
Butane Tank
FLAG POLE
STORAGE HOUSE
CAMP STORE
Weather Station
MAIN LODGE
GOPHER TRAPPING
shed
NATURE MUSEUM
TO FARM
BLACKSMITH SHOP
CRAFTS SHELTER
Water Tower
COOPER WELL
LINDSEY CABIN
GENECOV CABIN
LOGGING SHELTER
FISHING AREA
Pier
ROTARY BATH HOUSE
MIKE HARVEY CABIN
KIWANIS BATH HOUSE
GIRLS LIVING AREA
SLEDGE CABIN
RUDMAN (PIONEER MUSEUM)
CALDWELL CABIN
CLEARING HOUSE CABIN
TO LOG CABIN
TO PUMP STATION (water shed for Camp Tyler)
N
LAKE
TO ORGANIC GARDEN (1 acre plot)
POND LIFE STUDY
Trail



ALICE INDEPENDENT SCHOOL DISTRICT

ALDINE INDEPENDENT SCHOOL DISTRICT

Aldine Junior High Outdoor Classroom

The outdoor classroom at Aldine Junior High was developed from an unused courtyard surrounded by classroom wings.

The primary features of the outdoor classroom are a tropical bed, an East Texas bed, a desert bed, an experimental bed, a cutting bed, a compost pile, a weather station, a pond, and a patio with work tables.

Construction of the outdoor classroom was relatively inexpensive since bed borders were donated railroad ties, compost and mulching materials were donated by local paper and power companies, and many plant specimens were provided by members of the community.

Varied activities are provided for the students. An interdisciplinary approach allows students in social studies, mathematics, and science departments to work cooperatively on a gardening unit.

Some of the concepts developed through outdoor classroom activities are these:

- Organisms are interdependent with one another and their environment.
- Living things are adapted by structure and function to their environment.
- Living things are products of their heredity and environment.

Because it is an integral part of the school campus, the site provides a readily accessible resource for short field trips, supervised study projects, and long-term open-ended investigations.

HURST-EULESS-BEDFORD INDEPENDENT SCHOOL DISTRICT

Trinity High School

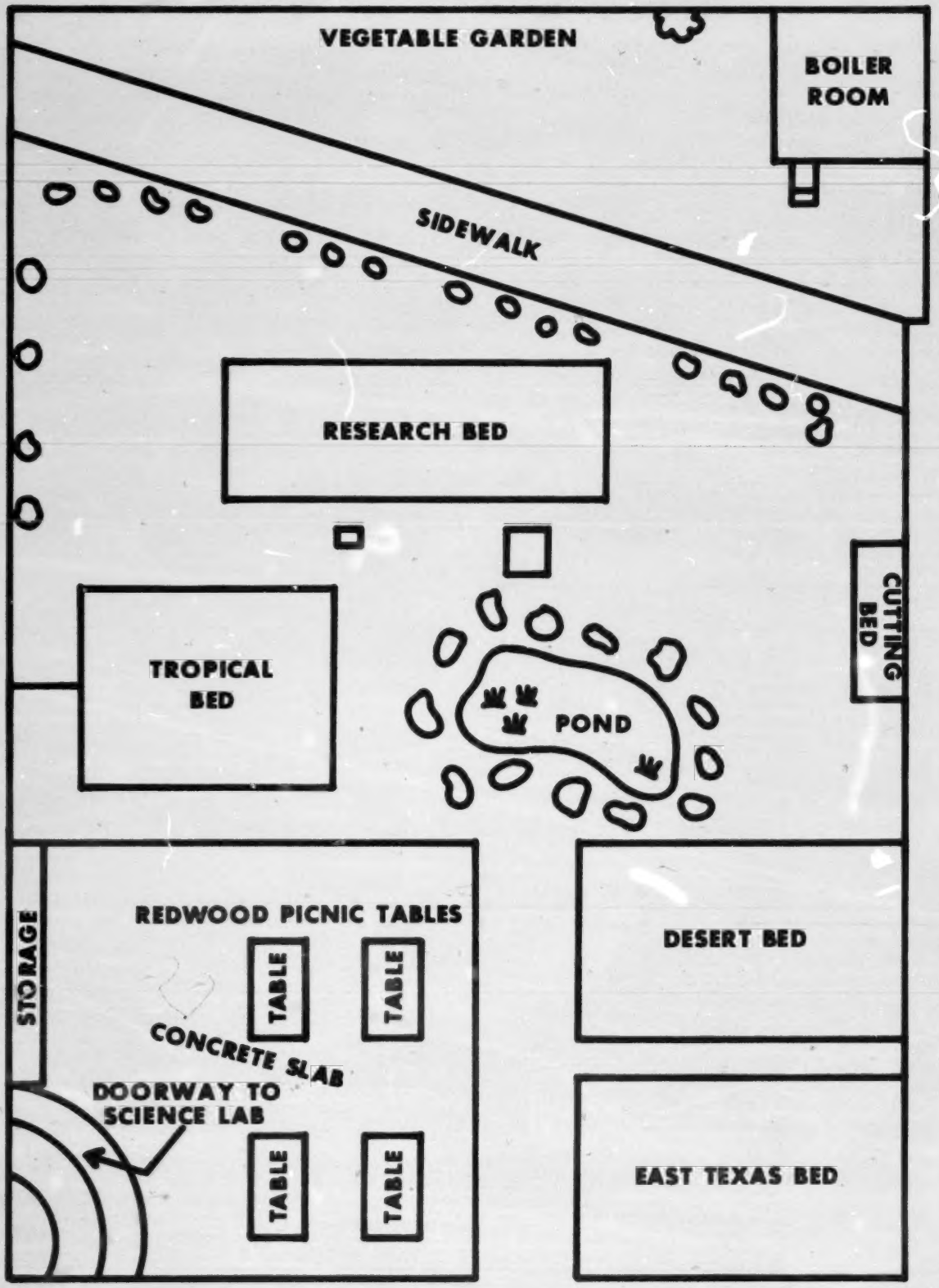
Trinity High School developed an outdoor study area on land that was a natural drainage area. The fenced area is approximately 60 by 100 feet containing a small pond in the center with a walkway around it. Bleachers in the enclosure will accommodate 30 students.

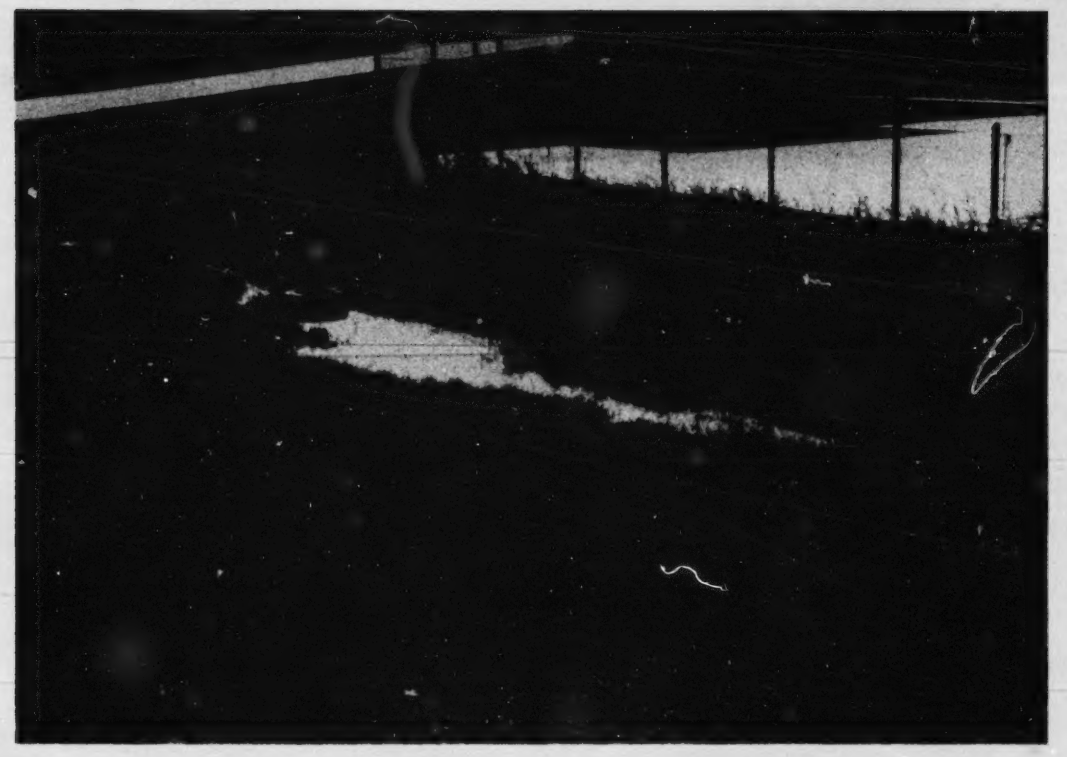
The area between the pond and fence has as large a variety of native trees and shrubs as natural competition will allow. The pond provides a ready source of live specimens including minnows, microscopic organisms, crayfish, frogs, and aquatic insects and plants.

The outdoor learning area is utilized by the biology classes for plant identification, studies of ecological succession in and around the pond, insect collecting and study, and other such activities. Other classes utilizing the learning area include art and English.

This area also is available to schools surrounding the Hurst-Euless-Bedford Independent School District.

BOTONICAL GARDEN
ALDINE JUNIOR HIGH SCHOOL





BEFORE

AFTER

HURST-EULESS-BEDFORD INDEPENDENT SCHOOL DISTRICT

VI. CHECKLIST FOR DEVELOPING AN OUTDOOR SCHOOL SITE PROGRAM

The following checklist should be useful to those with responsibility for developing an outdoor school site. All considerations indicated may not be appropriate for all sites (especially small ones). Select those steps which are appropriate for your site.

I. PRELIMINARY FUNCTIONS

___A. Organize a school site development committee with broadly based membership and interests.

___B. Acquire and review literature on outdoor classroom.

___C. Review and select those site uses (roles) which should be a part of the school site plan and which best fit the educational and neighborhood/community needs.

___D. If a new facility is planned, work closely with the school site selection committee and contractor to see that the site chosen meets these needs and that important site features and characteristics contributing to their fulfillment will not be altered or destroyed during construction.

___E. Establish a broad statement of purpose or some basic goals to be included in the master plan.

___F. Prepare or secure a site base map for each member of the committee.

II. DEVELOPMENT OF THE MASTER PLAN (guidelines for those who will develop and use the site)

___A. Introductory information

___1. Objectives and purpose of the site

___2. Photos if available

___3. School site map with key showing present and projected facilities, features, characteristics, etc.

___B. Description of each role served by the site and suggestions for development, use, and management of each role.

___1. Ecology role

___a. Description

___b. Suggested activities

Examples:

. Inventory plants and wildlife diversity

. Monitor weather patterns, erosion, water quality, etc.

. Map wildlife habitat

___2. Environmental management role

___a. Description

___b. List of suggested activities that will involve many areas of the curriculum.

Examples:

. Establish a school forest.

. Construct a pond.

. Develop a planting and beautification program.

___c. Important human historical and cultural influences on the region.

1. Evidence of prehistoric and early cultures

2. Pioneer history, old burial sites, relics

3. Influence upon the area by human resource development, use, and management, such as logging, mining, agriculture, shipbuilding, residential development, recreation, or highway development

Capitalize on important site features and characteristics which can help to develop this interpretive portion and, again, key important features on the map that relate to these influences.

___d. Suggested educational activities which could center on this site role.

Examples:

. Design and construct an interpretive nature trail system.

. Design and develop a trail for recreational vehicles.

. Construct a bridge over a brook or drainage way.

. Improve a wildlife habitat.

. Design and create new play equipment or areas.

___3. Natural history interpretive role

___a. Description

___b. Important natural historical influences on the region

Example:

Geological history--

- Processes contributing to formation of region
- Strata and age
- Evidence of life such as fossils and bones
- Important mineral deposits
- Unique features such as caves and outcrops

Capitalize on important site features and characteristics in developing this part. Be sure to key important features on the map that relate to these influences.

- Design and set up trail signs.
- Identify and place markers on trees (plants, minerals, etc.).
- Construct replicas of, or restore, early cultural artifacts.
- Plan and develop a visitor center.

___5. Multipurpose, school/neighborhood/community/recreation role

___a. Description

___b. Currently available uses of the site and their regulations and schedule for use

___c. Proposed uses (Consider planning a neighborhood or community survey to determine needs and wants such as more athletic facilities, parking areas, swimming areas, picnic areas, or hiking trails.)

___d. Present methods of management, maintenance, and funding of this function

III. IMPLEMENTATION OF THE PLAN

___A. Specific site development considerations include the following:

___1. What developmental functions should be carried out by the contractor (for a new facility)

___2. Costs plus contingencies

___3. Time schedule (if applicable)

___4. Guarantees (if work is contracted out)

___5. What development-management activities will be performed by:

a. The committee
b. The contractor
c. The school administrative staff
d. Pupils as part of the educational program

___6. What volunteer services and equipment are available for use

___7. How cost and performance of site maintenance will be handled (could be part of a pupil activity)

___8. Other considerations

IV. SCHOOL SITE PLANNING FUNCTIONS

___A. The development committee should make a preliminary survey of the total site with a resource person to become familiar with the area.

___1. Make notes and sketch in details on a site map.

___2. After the survey, share findings and comments.

___B. Organize the committee into smaller school site study groups according to the individual roles selected in I-C above.

___1. Each group should work with a resource person to:

___a. Make a site analysis specifically in relation to its role. (Several trips to the site may be necessary to get the desired data. Slides can help to record much information and can be useful later on).

___b. Make an analysis of the site's role to discover:

___1. How the role influences the site; for example, the need to alter drainage to provide a trail.

___2. How the site influences the role; for example, influences of site, topography on placement of a trail.

___2. One study group could focus on the regional and community influences which have helped to influence the site. This could be an independent group or the study group working on the natural history interpretation role.

___C. Reassemble in full committee to discuss, compare, and assess the individual study groups' findings and to determine how the roles will collectively influence and be influenced by the site and their relationships to each other.

___D. Develop the site plan which graphically illustrates the physical solution; i.e., how the physical aspects of the roles will (or may) become a reality. Work closely with a professional land planner, such as a landscape architect or other resource person.

VII. DEVELOPING ACTIVITIES FOR EDUCATION IN THE OUT-OF-DOORS

The first part of this guide outlines the selection and use of outdoor sites. Activity planning and implementation are the thrusts of the second part, where a discussion of general guidelines for planning activities and a disciplinary examination of outdoor education values are presented.

Outdoor education involves the learner, emphasizes the exploratory approach, and utilizes multisensory experiences. The key to successful learning in the out-of-doors lies in maximum student involvement. It is, after all, everyone's world. To restrict a student's intake to any narrow portion of it is to deny learning. The approach used should be one of guiding investigations to focus on a subject in ways which satisfy the student's needs as well as those of the teacher. Open-ended, sensory, student-centered interaction with the out-of-doors can be a rewarding experience for all.

From the standpoint of the school, outdoor education is a means of curriculum fulfillment. The outdoor setting increases the power of observation, stimulates interest, extends the classroom beyond the four walls, helps extend the teacher, and increases the opportunities for concrete learning by changing many abstractions into meaningful life situations. Exploration, research, and adventure in a natural setting are to be found in this always complete laboratory.

Using the outdoors as a learning environment changes people, causing them to gain new perceptions of themselves and of others. It also brings about change in the methods teachers use to help youngsters learn. Finally, it helps teachers and students look at subject matter in new ways.

Curriculum Areas

Outdoor education is interdisciplinary, cutting across many curricular areas. It possesses no subject matter of its own; yet its emphasis on ways of learning can be approached from disciplinary perspectives. Outdoor experiences listed in this section correlate with six major disciplinary areas: language arts, social studies, science, health, mathematics, art, and music.

Language arts and second language learning. These areas include reading, writing, listening, and speaking. All are based on experiencing, which is the heart of outdoor education. The out-of-doors is a classroom which provides a wealth of opportunities for exploration and investigation in the world in which children live, stimulating them in oral and written expression. In addition, many organic and geological

objects in nature have Latin names used in identification. This is a little explored area of language arts. As seen in the following list of suggested outdoor activities, students can draw much language arts enrichment from nature:

- Writing letters to congressmen and conservation groups
- Keeping a diary or log of activities
- Noting observations into a notebook or tape recorder
- Reading and reviewing nature books
- Writing or telling stories about nature
- Writing articles for the school newspaper
- Discussing in groups possible courses of action
- Labeling and classifying specimens
- Reading or writing poetry
- Writing or enacting dramatizations
- Explaining orally to other students or to the teacher
- Making signs for activities
- Relating personal experiences
- Keeping a vocabulary notebook
- Compiling field notes
- Listening to and interpreting sounds in nature
- Researching careers in the outdoors

The use of imagery in observing living organisms often leads to delightfully creative poems and dialogues.

Social studies. Social studies is another discipline which can be pursued readily in the outdoors. Many natural activities and experiences can be used to foster democratic living. Students working alone or in groups can be led by an understanding, patient teacher and the lure of a natural environment gradually to reduce their dependence on adult guidance. Later, the teacher will guide them into long-term assignments requiring greater skill in working together and in sharing and accepting responsibility.

Sociological experiences in the out-of-doors can deal broadly with history, geography, economics, democratic institutions, and community culture. A democratic spirit and the close ties that bind human beings can hardly be found in a more appropriately natural setting than in a group of people dependent on each other and their out-of-doors environment for answers to significant questions.

Among the experiences and opportunities which outdoor education provides the social studies students are:

- Identifying with others
- Sharing ideas, materials, and responsibility
- Respecting group decisions and the rights of others
- Developing initiative in making choices
- Solving problems cooperatively

Accepting success, failure, limited capabilities, and leadership

Working with others

Gaining self-reliance, self-confidence, self-control, and self-respect

Learning about the depletion, restoration, control, and protection of natural resources

Understanding the effect of natural resources on population distribution

Learning about native cultures

Visiting historical sites

Interviewing old settlers, forest rangers, game wardens, individuals in outdoor-related occupations

A search for deeper understanding of the relationships of people to each other, to a place, and to nature becomes a meaningful dimension for students in an outdoor classroom.

Science. A third discipline easily adapted to an outdoor laboratory is science. Curiosity and enthusiasm should lead students to uninhibited exploration of the world's features and residents using their broad spectrum of senses and feelings. Biological, chemical, and physical processes in nature can be studied endlessly. The only limit is the teachers' and students' imagination. Gradually, the multisensory approach to teaching science begins giving way to the intellectual approach so that skills and science concepts will take form. Emphasis then shifts to problem-solving; generalizing, and the development of a scientific approach to problems.

The following are some out-of-doors activities and projects involving science:

Observing wildlife, sky, and stars

Prospecting for minerals, fossils, and shells

Identifying trees, birds, and plants

Collecting rock, mineral, seed, wood, and insect specimens

Recording bird calls and native sounds

Tracking animals in mud and snow

Testing soil and water

Studying stream, soil, and air pollution

Observing weather

Studying and controlling erosion

Caring for insect, animal, and plant specimens

Growing plants from seed

Inviting soil conservation, weather, and other specialists with outdoor-related careers

Gathering materials for laboratory studies

Observing living things, geological formations, weather, and celestial bodies

Examining life along a stream or road

Exploring animal homes

Mapping

Studying management and conservation of natural resources

Identifying animals, plants, rocks, and weather

Studying the interrelation of people and their environment

Science instruction in the out-of-doors will bring new insights into people's relation to nature and will develop a reverence for the orderliness of nature and for those things beyond human power to control.

Health. Another disciplinary area which lends itself to the outdoor classroom is health. The teacher of health is concerned with the development of positive habits and attitudes related to the personal health and well-being of individual children. Explorations and observations in the out-of-doors can be scheduled in cold or hot weather, in windy or rainy seasons, or on snowy or muddy days. During these times, as well as under normal conditions, each student can be guided in understanding personal hygiene, selection of proper clothing, sanitation, and food preparation.

Good health is generally dependent upon proper physical activities. Physical education is the oldest form of education. From the Greeks came the foundation for modern gymnastics, calisthenics, military drill, corrective work, strict discipline, and feats of endurance. Natural outdoor physical activities such as running, jumping, swinging, and swimming should be an integral part of outdoor education. Athletic prowess is essential for swimming across a stream or pond, climbing a tree, or digging up a weed. These physical activities should be carefully planned to avoid overexertion or injury.

A health teacher is also concerned with safety education, which calls for helping children make intelligent choices when they are confronted with hazardous conditions. The outdoors provides children with ample experiences with potentially hazardous situations. An observant and perceptive teacher can turn potentially dangerous encounters into learning experiences which eliminate much trial-and-error frustration later in a child's life.

Safe and careful habits, alertness and the rewards of health, physical exercise and safety can be stressed through the following activities:

Cutting and gathering firewood

Chasing butterflies with a net

Jumping across a stream

Lifting another person to reach a tree limb

Hiking

Digging for erosion practices

Canoeing

Cleaning up a work area

Gathering specimens for nature study

Angling

Running along a stream in following a piece of floating wood or a fish

Hygiene, safety and physical exercise can become important natural ingredients in outdoor education.

Mathematics. Mathematics learning can also take place in a field, marsh, or school ground. Exacting relationships exist everywhere in nature. Measurements and calculations of length, area, volume, distance, and time pertain to all of life. Where there is motion a student must be concerned with speed, distance, time, rate of travel, height, and acceleration.

Mathematics in the outdoors has the one great advantage of connecting calculation with application. Meaningful learning uses practical examples and applications. The needs imposed by nature and society often call for mathematical solutions. The natural sequence of learning is to develop mathematics to fill specific needs.

Beginning at the first grade with place value and counting, through the arithmetic skills and into geometry and trigonometry, mathematical concepts abound in nature. The following suggested activities bear this out:

Plotting weather, water velocity, and growth graphs

Using a stump to determine a tree's age

Making scale maps and drawings

Finding direction by compass, sun, and stars

Determining speed with a stop watch

Counting specimens

Planning amount and cost of equipment needed for activities

Constructing a tent, bridge, shelter, or bird feeder

Pacing, estimating, and measuring distances

Measuring the height, circumference, and diameter of a tree

Estimating the percentage of slope

Measuring tree height by shadows

Determining the distance to a lightning bolt

Measuring the depth and moisture content of snow

Estimating or measuring the width and depth of a stream or pond

Averaging the number of plants, rocks, insects, or animals in a specified area

Averaging the height of trees or grasses

Art. Art qualities are all around us and the teacher who helps children find these helps them build a foundation for art and for greater enjoyment of life.

Outdoor education provides many opportunities for the development of awareness of design in nature. To develop this awareness is one of the objectives for art education. As a part of the art experiences, teachers are encouraged to take children outdoors on looking walks to find texture, line, color, shape, form, and pattern in natural objects. This will help children to be more perceptive and also help to make life more enjoyable.

Sensory experiences--sight, touch smell, taste, sound--aid children in gaining a better concept of that which is to be expressed through art. Using these sensory

experiences help children express their ideas with greater sensitivity. Outdoor education can provide for such experiences. Moreover, through studying and observing the outdoors, children gain ideas and inspiration for art work.

The following art experiences can be emphasized in outdoor education:

Observing design in nature

Sketching

Modeling with clay

Weaving with grasses

Sandcasting

Sculpting with found objects

Making rubbings from leaves or various textures

Photographing design

Interpreting sounds into visual form

Music. Many of the great musical compositions were inspired in the outdoors. The appreciation and inspiration of music--singing, listening, and rhythmic activities--supplements all other disciplinary experiences in nature and brings greater satisfaction to the needs and interests of children. The day and night sounds of birds, crickets, frogs, streams, and trees bring peace and joy to perceptive ears. A natural approach to rhythmic response emanates from the movement and grace of swaying trees, rippling brooks and grasses, and body movements of birds and worms.

Music in nature can be emphasized through the following suggested activities:

Discovering the various sounds made by striking different types of wood

Listening to records or tapes of nature sounds as portrayed in music

Marching, skipping, clapping, and keeping rhythm to music

Composing music based on sounds of nature. Composing sounds about nature.

Imitating bird calls

Distinguishing animals by their sounds or characteristic movement

Singing Swiss and other European hiking songs

Listening to nature's music

Making and playing primitive musical instruments, such as pipes from different lengths of reeds

Career Education. Since many define career education as the totality of educational experiences through which one learns about work, outdoor education is a natural for instilling among students a desire to work; acquiring skills necessary for work; and actually engaging in work that is satisfying to individuals and groups.

The following activities are suggested:

Studying woods that are used for commercial purposes, perhaps analyzing the amount

of labor required for lumbering a tree until it has become a part of a structure

Designing plans for locating and constructing park sites for leisure time use

Describing the characteristics of outdoor workers and their roles in the benefit of society

Vocational education. The outdoors is a realistic environment in which many vocational students can practice skills they have learned in class. Since vocational students spend much of their class time in shops and laboratories, the outdoor education site could provide a good chance of setting for class activities. The number of activities which could be done outdoors would depend on the nature of the vocational class.

Vocational students could play an important role in designing and constructing the outdoor site. This could be done during class time, or as service projects by the vocational youth groups.

The outdoor laboratory could be used for the following vocational education activities:

Identifying species of grasses

Innoculating small domestic animals which live on the site

Landscaping an area

Photographing animals and plants

Building benches

Surveying the area

Holding a child care nursery outdoors

Preparing food on outdoor grills

Simulating an accident in which a student breaks an arm, and administering the proper first aid

Looking for edible plants

Designing a public service newspaper ad which explains outdoor education in the school

The activities that follow are suitable for a number of subject areas. Adaptations for each curriculum area are suggested.

VIII. OUTDOOR EDUCATION EXPERIENCES

OUTDOOR EDUCATION EXPERIENCE NUMBER 1

Construct a homemade weather vane and use it to find changing directions in the wind.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	On a windy day, write a paper on how it feels to stand in the wind.
Social Studies	Discuss the effect of wind in history (sea and air battles). Discuss how agricultural endeavors have been influenced by the wind. Discuss how other cultures view the wind.
Science	Discuss the effect of wind on the environment. Measure the wind direction in several areas.
Health	Discuss how wind changes might affect the sinuses of class members.
Mathematics	Find the changing direction of the wind across a given area and plot the data.
Art	Decorate the wind vanes.
Music	Construct wind whistles for the vane.
Career Education	List the skills necessary in becoming a television weather forecaster.

OUTDOOR EDUCATION EXPERIENCE NUMBER 2

Lie on your back and watch the sky on a cloudy day.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Read the daily weather report in the newspaper over a period of time and keep a record of the accuracy of the prediction for cloud conditions.
Social Studies	Discuss the effects of clouds on various geographic areas and on the people living in these areas.
Science	Try to find and identify different kinds of clouds. Discuss how clouds affect the weather. Predict weather changes from clouds.
Health	Discuss effects of cloudy vs. sunshiny days on mood. Is it possible to sunburn on a cloudy day? Discuss why.
Mathematics	Estimate the size and speed of clouds by comparison with stationary objects on earth.
Art	Find meaningful or attractive shapes and sketch them.
Music	Create a short melody suggested by an approaching star.
Career Education	Identify cloud shapes as they pertain to specific tools for working.

OUTDOOR EDUCATION EXPERIENCE NUMBER 3

On a sunny day trace shadows of different objects at 9 a.m., noon, and 3 p.m.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Write a fable about shadows.
Social Studies	Discuss sundials and calendars as used in early civilization.
Science	Examine how sizes of the shadows change as the time of day changes.
Health	Examine changes of the pupil of the eye in shade and sunlight.
Mathematics	Calculate the height of a telephone pole or tree by measuring its shadow.
Art	Make profile drawings from shadows of fellow students' heads; cut and mount decoratively. Construct a sundial.
Music	Do interpretive dances as objects and shadows.
Career Education	Discuss how different times of the day affect work performance.

OUTDOOR EDUCATION EXPERIENCE NUMBER 4

Dig holes in the ground to depths of 15, 30, 45, and 60 cm. Insert a thermometer in the dirt at the bottom of each hole. Be sure to shield the thermometer from the breezes.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Be a plant and write on how the roots feel as they go further down.
Social Studies	Discuss how ground temperature affects farming.
Science	Take the readings in each hole, average them, and construct a chart. Account for any differences.
Health	Discuss the effects of volcanoes and hot springs on human health.
Mathematics	Read a thermometer and average the readings.
Art	Draw different soils. Try to make pottery with different soils.
Music	Write a song about the weather.
Career Education	Report the number of occupations that may in some way utilize the thermometer.

OUTDOOR EDUCATION EXPERIENCE NUMBER 5

Take a tour of a pond. Browse and explore.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Select several synonyms for erosion and examine their meanings.
Social Studies	Discuss different soils and the effect of erosion on these soils.
Science	Examine the deposited materials at the bottom of an eroded site. Account for the larger and heavier materials building up where they do.
Health	Describe how continual soil erosion can affect human health in an agrarian culture.
Mathematics	Measure the width and depth of an eroded area; then determine the volume.
Art	Collect different items or pieces from the soil and make a "creation." Photograph interesting patterns and designs found in the area.
Music	Gather reeds growing near the water surface. Carve from the reeds small openings for use as small wooden flutes. Some of the reeds can be used as rhythm instruments rather than melody instruments.
Career Education	Describe the procedures employed in producing a people-made pond.

OUTDOOR EDUCATION EXPERIENCE NUMBER 6

Tie some cheesecloth between two broomstocks and weight the bottom. Run upstream for a few meters and see the type of water animals trapped. Be sure to hold the net at a 45-degree angle to the water surface.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Read to discover the types of life in streams and other geographic locations.
Social Studies	Describe how the use of nets in bodies of water has shaped the lives of people in various societies.
Science	Catch tadpoles. Bring them to the classroom and feed them commercial fish food. Record their physical activity and changes.
Health	Describe any identifiable trapped organisms that may be hazardous to human health.
Mathematics	Establish the flow rate of the stream in cubic centimeters per second.
Art	Use the debris caught by the net to make a collage.
Music	Listen closely to the sound of the moving water. Determine if it seems to be moving in 2/4 or 3/4 meter.
Career Education	List the skills necessary for becoming a parks and wildlife worker.

OUTDOOR EDUCATION EXPERIENCE NUMBER 7

Locate and count the number of species of small animal life along the banks of a stream, in the mud, and in the water.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Use the names of the various animals for vocabulary development.
Social Studies	Discuss the various laws that protect animals. Discuss how these animals affect us.
Science	Catch animals in kitchen strainers or in old nylon hose sewn to coat hangers. Transport the catch in baby food jars. Classify the animals.
Health	Describe the health effects of the various species. Examine the stream water for mosquitos. Discuss what could be done to lessen the breeding of mosquitos.
Mathematics	Determine ratios of different species found.
Art	Draw different types of species. Sketch area where specimens are found.
Music	Listen to recordings of *The Carnival of the Animals* to discover how composers use music to describe all types of animal life.
Career Education	Have students collect items that could be classified as "marketable."

OUTDOOR EDUCATION EXPERIENCE NUMBER 8

Walk along a stream until the stream begins to slow; then stop and browse.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Write a summary about what was seen during the walk.
Social Studies	Discuss the effect of rivers and streams on the development of civilization. Observe the evidence of pollution.
Science	Determine the effects of the slowing of stream water on sedimentation rate and size. Place a handful of soil in a container of water. Shake and let settle. Observe.
Health	Discuss the health aspects of the stream. How can the stream water be purified for drinking?
Mathematics	Count the different materials found, measure, and describe.
Art	Draw the different materials found floating.
Music	Listen closely to the sound of the moving water. Determine if it seems to be moving in 2/4 or 3/4 meter.
Career Education	Compare by writing a paragraph the slowing stream to retirement from a job.

OUTDOOR EDUCATION EXPERIENCE NUMBER 9

Test the "hardness" of pond or stream water. In a container, see how many drops of detergent are needed to get lather of a certain height. The harder the water, the greater the number of drops of detergent required.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Read various detergent packages to see if they can be used in hard water. Report to the rest of the group.
Social Studies	Describe some detrimental effects of hard water in home and industry.
Science	List the chemical content of hard water and what chemicals are needed to soften it.
Health	Discuss the health effects of cooking, drinking, bathing, and laundering with hard water.
Mathematics	Measure the number of drops of detergent needed to obtain a specified height of lather in containers of pond, stream, faucet, and rain water.
Art	Draw a cartoon of a molecule of water surrounded by molecules of potassium, calcium, sodium, etc., which add hardness to water.
Music	Drop pebbles into the water at different depths. Determine the reason for the differences in pitch at different depths. Compare to the different string sounds made on a violin.
Career Education	Have a company representative describe the duties of a "soft water" sales and/or service representative.

OUTDOOR EDUCATION EXPERIENCE NUMBER 10

Feel and observe the bark of four different kinds of trees.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Write a description of how each type of bark feels.
Social Studies	Describe how bark is used by different cultures.
Science	Classify the observed bark according to roughness, color, thickness, shape, tree name, and tree type.
Health	Describe medicines obtained from tree bark.
Mathematics	Measure the circumference of the tree trunk at 50, 100, and 150 cm. above the ground for each tree. Calculate the average circumference and diameter.
Art	Using colored construction paper, create an outdoor picture which includes one of the four types of trees.
Music	Discover the various sounds made by striking different kinds of woods with a hard mallet.
Career Education	Describe the different fencing materials in the residential neighborhood and list the kinds of wood used.

OUTDOOR EDUCATION EXPERIENCE NUMBER 11

Pick five leaves from different trees and arrange them according to the shade of green they contain.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Discuss the need for beautifying your community or parts of it with trees. As a group, develop a plan for accomplishing the goal over a period of time.
Social Studies	Describe how tree leaves affect the lives of people.
Science	Explain the causes of variations in the color of leaves. Identify the tree each leaf was taken from.
Health	Name examples of chlorophyll in medicine.
Mathematics	Trace the outline of each leaf on a piece of paper and draw all the lines of symmetry.
Art	Make charcoal rubbings of all five leaves.
Music	Using body sounds, try to reproduce the sound of leaves rustling in the wind.
Career Education	Count and list the types of advertisements that have tree leaves as a part of the pictorial display.

OUTDOOR EDUCATION EXPERIENCE NUMBER 12

Select one tree and make a detailed study of it.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Tell what things you like about the tree which made you choose it.
Social Studies	Describe the his.ory, uses, and distribution of this tree.
Science	Compile a complete identification chart for the tree.
Health	Describe the diseases which this type of tree might have.
Mathematics	Measure the diameter of the tree at a distance of 150 cm. above the ground. Determine the height of usable timber. Calculate the number of board feet of lumber in the tree.
Art	Make a crayon drawing of the tree.
Music	Use the body to show how trees whip back and forth in the wind. Start with a little wind. Then as the wind increases, the branches whip and bend to the ground then reach up high until they break.
Career Education	List the ways in which one might earn money from the products of a tree.

OUTDOOR EDUCATION EXPERIENCE NUMBER 13

Select a flowering plant and count the number of insect visitors it has in a five-minute period.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Write a story describing what kind of plant you would choose and why if you were a hungry insect.
Social Studies	Describe how insects affect various ways of life.
Science	Classify the insect visitors according to their names.
Health	Discover if any of the insects observed can injure people in any way.
Mathematics	Compute how many insects of each type were observed. Estimate how many could be observed in one hour.
Art	Draw or paint pictures of an insect.
Music	Create a sound composition imitating as many insect sounds as you can.
Career Education	View a film on honey-producing bees and compare their survival and productivity with individuals employed at an industrial site.

OUTDOOR EDUCATION EXPERIENCE NUMBER 14

Collect a variety of insects, snails, worms, and other animals.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	As a literary spider, write a plan for catching a fly.
Social Studies	Select one insect or animal and describe how large numbers of this form of life in a specified area of the world affect the lives of people.
Science	List the external characteristics which could be used to classify the collected specimens.
Health	Identify the specimens which could be classified as dangerous to human health. Explain how they might be dangerous.
Mathematics	Weigh each specimen collected and count the number of legs. Calculate which specimen carries the greatest amount of weight per leg.
Art	Talk about the colors, lines, shapes, texture, and design seen in the insects, worms, snails, and other animals collected. Use as ideas for drawing and painting.
Music	Create a sound composition imitating as many insect sounds as you can.
Career Education	Interview workers who earn a livelihood based on their knowledge of insects and/or animals.

OUTDOOR EDUCATION EXPERIENCE NUMBER 15

Observe the movements of birds for 10 minutes.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Use library resources to discover which birds in your area migrate. Where do they go? How long does it take them?
Social Studies	Describe some characteristic activities of birds that are similar to human activities.
Science	Identify and classify the birds observed.
Health	Explain how birds or parts of birds are used in folk medicine.
Mathematics	Count the number of birds of each species observed. Estimate the total population of the area observed for each species.
Art	After studying the movement of a variety of birds, interpret these through body movement, then through brush lines on paper.
Music	Pretend you are a bird in flight. What music could be used to accompany your movement?
Career Education	Compare the flight of birds and their characteristics to the flight and design of aircraft.

OUTDOOR EDUCATION EXPERIENCE NUMBER 16

Select a quiet spot and listen to bird sounds.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Write a poem about the songs of birds.
Social Studies	Describe observed similarities between social conversation in people and bird sounds.
Science	Record some common bird calls, memorize them, and try to imitate them where a bird can be observed reacting to the sounds.
Health	Describe possible effects of bird sounds on the mental state of a person recovering from an illness.
Mathematics	Note and record the frequency and length of calls from a single bird. Calculate the average frequency and length of the calls.
Art	Make a drawing of a bird defending its territory.
Music	Use the imitation of a bird's call to attract other birds.
Career Education	Make a list of procedures for collecting bird sounds and note how they could be used commercially.

OUTDOOR EDUCATION EXPERIENCE NUMBER 17

On the map of the outdoor area (drawn by students) mark the bird population and observe distribution.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Assume you are a specific species of bird, describe your physical characteristics and habits, and have others guess your name.
Social Studies	Determine if a selected bird has a territory which it claims and defends. If so, draw its territorial boundaries on the map. Are territorial boundaries of birds similar to those of people?
Science	After careful observation, mark the principal location of each bird in the area on the map. Note the distribution.
Health	Discuss the effects of population overcrowding on the health of birds or people.
Mathematics	Count the total number of birds observed, calculate the area of the map, and compute the amount of land area per bird or the bird density per square meter.
Art	Make a drawing of a bird defending its territory.
Music	Imitate bird calls.
Career Education	Discuss how birds influence life balance, especially as related to work environment.

OUTDOOR EDUCATION EXPERIENCE NUMBER 18

Observe birds in an attempt to find out what alarms them, how they communicate alarm to each other, and how different individuals react to alarm.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Shout various calls of alarm to unsuspecting birds. Observe their reactions and write them in a notebook.
Social Studies	Describe the purposes and reactions of birds that cry out in alarm.
Science	Keep a record showing the cause for the alarm, description of the alarm, method of spreading it, and reactions. Record alarms on a tape and play them back to note reaction.
Health	Discuss the need for alarms for mutual protection.
Mathematics	Count the number of alarms communicated in each episode, and compare this to the number of birds that fly away or react in other ways.
Art	Observe the colors, lines, shapes, and forms of the birds being studied.
Music	Listen to the recording of "The Aviary" from *The Carnival of the Animals*. How are sounds used to describe bird sounds?
Career Education	Compare through role-playing how a group of workers who are alarmed or have fears may increase or reduce their productivity.

OUTDOOR EDUCATION EXPERIENCE NUMBER 19

Observe birds to test the validity of using them to forecast weather.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	Using an appropriate picture as a stimulus, pretend you are a bird flying into a rainstorm. Describe your feelings.
Social Studies	Make a list of the observed behavior of birds when they are alone and when they are in groups. Compare.
Science	List various ways in which the behavior of birds is related to changes in weather.
Health	Describe ways in which primitive peoples depended on birds for their safety.
Mathematics	Estimate the average speed of birds and compare it to temperature, relative humidity, and barometric pressure.
Art	Draw a group of birds as they would appear during an approaching thunderstorm.
Music	Perform creative dance movements imitative of the movements observed from the birds, trying to accurately effect the same changes which birds make relative to the changes in the wind
Career Education	Describe how weather changes affect certain types of employment.

OUTDOOR EDUCATION EXPERIENCE NUMBER 20

Observe and examine fresh snowflakes.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	After having observed falling snow, write a poem about snowflakes.
Social Studies	Describe differences in the types of work done in cold and warm climates.
Science	Collect snowflakes and preserve them, noting the time, temperature, and humidity. Relate these three variables.
Health	Describe types of clothing worn for protection against snow.
Mathematics	Measure the size of various snowflakes and determine their lines of symmetry. Compare these to temperature.
Art	Make paper cutouts of snowflakes.
Music	Learn the song "Let It Snow."
Career Education	Name the leisure time industries that capitalize on snowfall.

OUTDOOR EDUCATION EXPERIENCE NUMBER 21

Collect a variety of wildflowers and observe them.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	While viewing wildflowers growing in their natural surroundings, write a haiku poem about wildflowers.
Social Studies	Describe the use of wildflowers for decoration.
Science	Classify each flower according to color, smell, type of plant, and attractiveness to bees.
Health	Determine the pollen count and allergenic characteristics of each flower.
Mathematics	Measure the average diameter of the flower and count its petals. Compare these to the height of the plant.
Art	Design a large (18" x 24") flower seed packet. These could be imaginary flowers.
Music	Select a quiet spot near a stream or patch of wildflowers, observe the beauty, and compose a short melody that captures the mood.
Career Education	Discuss the virtues of the ecology movement on industrial production.

OUTDOOR EDUCATION EXPERIENCE NUMBER 22

Carefully remove one plant every 60 centimeters for 6 meters in a field and observe its characteristics.

SUBJECT	CORRELATING ACTIVITIES
Language Arts & Language Learning	After having dug up several plants, write a story about a small plant that is suddenly dug up and examined by a stranger.
Social Studies	Determine which of these plants may be used as a natural food.
Science	Classify the root and leaves of each plant according to type. Observe and record on which side of each plant there is more root and leaf growth. Explain.
Health	Determine which of these plants are beneficial in health care.
Mathematics	Measure the length of the longest root of each plant and the distance from that plant to its nearest neighbor. Compare.
Art	Sketch one of the plants.
Music	Compose and sing a song about grass or weeds.
Career Education	List the qualifications of a horticulturist.

IX. RESOURCES

SOURCES OF FREE AND INEXPENSIVE MATERIALS

When ordering materials from these resources, please state specific areas of interest and types of materials which will be effective.

Air Pollution Association
440 Fifth Avenue
Pittsburgh, PA 15213

American Forest Institute
1619 Massachusetts Avenue, N.W.
Washington, DC 20036
Posters, units, and games available for forest-related topics.

American Forestry Association
1319 Eighteenth Street, N.W.
Washington, DC 20036

Conservation & Environmental Studies Center
Box 2230, RD 2, Whitesbog
Brown Mills, NJ 08015

ECO America
Room 2200
99 Park Avenue
New York, NY 10016

Environmental Protection Agency
Washington, DC 20460

The Garden Club of America
598 Madison Avenue
New York, NY 10022
Distributes a free conservation packet, *The World Around You.*

National Audubon Society
1130 Fifth Avenue
New York, NY 10028
Provides a wide variety of teaching aids to introduce school children to nature study.

National Forest Products Association
1619 Massachusetts Ave., N.W.
Washington, DC 20036

National Parks & Conservation Federation
1701 Eighteenth Street, N.W.
Washington, DC 20036

National Wildlife Federation
1412 16th Street, N.W.
Washington, DC 20036
Seeks to encourage citizen and governmental action for the conservation of natural resources. Publishes *Ranger Rick* and many outdoor education activity guides.

Natural Science for Youth Foundation
763 Silvermine Road
New Canaan, CT 06840
Helps communities set up natural science centers.

Rodale Press Inc.
Organic Park
Emmaus, PA 18049
A wealth of information about gardening on school sites.

Soil Conservation Society of America
7515 N. E. Ankeny Road
Ankeny, IA 50021

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402
Source for many documents related to outdoor education. Ask for their catalog.

U.S. Department of Agriculture
Forest Service
Washington, DC 20250

U.S. Department of the Interior
National Park Service
Washington, DC 20240

U.S. Department of Agriculture
Soil Conservation Service
Washington, DC 20240

U.S. Geological Survey
306 East Eighth Street
Austin, TX 78701

The Wilderness Society
729 Fifteenth Street, N.W.
Washington, DC 20005

Worthington Outdoor Education Program
600 West Dublin-Granville Road
Worthington, OH 43085

SUGGESTED REFERENCES

Books

Ashbaugh, B. L. and Kordish, R. J. *Trail Planning and Laycut.* New York: National Audubon Society, 1965.
Fundamentals for setting up a nature trail. Many pictures and drawings. Includes planning, construction, specifications, design, and education aids.

Benton-Werner. *Manual of Field Biology and Ecology.* Minneapolis: Burgess Publishing Company, 1972.

Brown, Vinson. *Amateur Naturalists Handbook.* Boston: Little, Brown & Company, 1948.
Complete training book for beginning naturalists. Covers rocks, minerals, plants, animals, etc. Three divisions for different stages of training. 475 pages. 204 illustrations.

Church, Thomas D. *Gardens Are for People.* New York: Reinhold Publishing Corporation, 1955.

Comstock, Anna B. *Handbook of Nature Study.* Ithaca, N.Y. Comstock Publishing Associates, 1955.
Twenty-fourth edition of a classic work on nature study. Approximately 700 separate subjects in nature are discussed.

Garrison, C. *Outdoor Education: Principles and Practice.* Springfield, Ill.: Charles C. Thomas, 1966.
Tips of teaching techniques. Practical suggestions for involving students in outdoor activities.

Laun, Charles. *The Natural History Guide.* 2nd ed. Alton, Ill.: Alsace Books & Films, 1967.

A study, reference, and activity guide. One of the best in the field for equipment construction, wild animal care and feeding, nature photography, charts, additional reference books and much more.

Robinette, Gary O. *Plants, People, and Environmental Quality.* Washington, D.C.: U.S. Government Printing Office.

Rosengrel, John H. *Outdoor Science for the Elementary Grades.* Englewood Cliffs, N.J.: Parker Publishing Company, Inc., 1972.

Simonds, John O. *Landscape Architecture: The Shaping of Man's Environment.* New York: McGraw-Hill, 1961.

Smith, J. W.; Carlson, R. E.; Donaldson, G. W., and Masters, H. B. *Outdoor Education.* Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1972.

A classic in the field of outdoor education.

Van Matre, Steve. *Acclimatizing.* Martinsville, Ind.: American Camping Association, 1974.

Follow-up workbook approach to *Acclimatization.* Detailed information on group dynamics. Many short awareness exercises that can be used just outside the school door.

Vinal, W. G. *Nature Recreation: Group Guidance for the Out-of-Doors.* New York: McGraw-Hill, 1940.

An old one, but a good one. Contains many ideas on how to involve people in nature study.

Activity Guides

Cooper, E. K. *Science in Your Own Backyard.* New York: Harcourt, Brace & Company, 1960.

Many simple fascinating experiments requiring only easily available materials. Ideal for school sites.

Goering, Oswald H., and Vander Smissen, Margaret. *A Leader's Guide to Nature Oriented Activities.* 2nd ed. Ames: Iowa State University Press, 1968.

Detailed information about nature programs, crafts, games, and outdoor living skills.

Gross, P., and Railton, E. P. *Teaching Science in an Outdoor Environment.* Berkeley, Calif.: University of California Press, 1972.

Hammerman, D. R. and W. M. *Teaching in the Outdoors.* Minneapolis: Burgess, 1964.

Ideas for integrating and enriching all subject matter areas through outdoor education. Philosophy plus techniques.

Hillcourt, W. *Field Book of Nature Activities.* New York: G. P. Putnam's Sons, 1950.

Hundreds of ideas for field work in one handy book.

Hug, John W., and Wilson, Phyllis J. *Curriculum Enrichment Outdoors.* Evanston, Ill.: Harper and Row, 1965.

Sample outdoor activities can be used in language arts, social studies, mathematics,

art, music, and science. Listing of activities according to grade level appended.

Lawrence Hall of Science. *OBIS (Outdoor Biology Instructional Strategies).* Trial ed., set 1. Berkeley, Calif.: University of California Press, 1974.

A series of 24 individual worksheets on a wide variety of outdoor biology exercises. A new product that shows promise.

Milliken, M.; Hamer, A. F.; and McDonald, E. C. *Field Study Manual for Outdoor Learning.* Minneapolis: Burgess, 1968.

Specific directions for carrying out several outdoor labs on water, soils, habitat, plants, mapping a site, and weather. Worksheets included in the manual.

Russell, H. R. *Ten-Minute Field Trips: Using the School Grounds for Environmental Studies.* Chicago: J. G. Ferguson, 1973.

Specifically designed for short trips to the school site. Divided into guidelines for related classroom activities, teacher preparation, and "field trip possibilities" for each major topic. Excellent drawings.

Samples, R., et al. *ES-SENSE I.* Olympia, Wash.: Essentia, Evergreen State College, 1973.

A series of 75 activity cards requiring common sense and sometimes tape recorders and/or cameras. Expensive, but a source of many imaginative ideas.

Schatz, A., and Schatz, V. *Teaching Science with Garbage.* Emmaus, Pa.: Rodale Press, Inc., 1971.

Thirty interdisciplinary activities based on waste disposed of by students' families.

Schwartz, Alvin. *How to Fly a Kite, Catch a Fish, Grow a Flower, and Other Activities for You and Your Child.* New York: The Macmillan Co., 1968.

Swan, G. D. *Tips and Tricks in Outdoor Education.* Danville, Ill.: Interstate Printers & Publishers, Inc., 1970.

X. SCHOOL DISTRICTS OFFERING OUTDOOR EDUCATION AS OF NOVEMBER 1973*

Abilene Independent School District
Science, grades 3-12
Elementary--Nature trails
Secondary--Nature study

Aldine Independent School District
Multidisciplinary
Environmental Studies

Anahuac Independent School District
Multidisciplinary
Natural trails and classroom sites
Observations in outdoor setting
Study of plant and animal life

Aransas Pass Independent School District
Field trips to marine environments, salt marshes, jetties, open beaches, and related areas.

Austin Independent School District
Resource specialist available to all subject areas
Field trips to observe natural environment of the city

Brownwood State Home and School for Girls
Nongraded
Camping skills, canoeing, hiking

Bryan Independent School District
Life Science
Outdoor classroom

Buckholts Rural Independent School District
Biology
Farm tank--collecting specimens

City View Independent School District
Science, grades 7-8
Railroad track ecology, water pollution, pond life

Cleburne Independent School District
All grades
Nature trails, wooded site

Coldspring-Oakhurst Independent School District
Science 7-12
Vocational Agriculture
Nature study, forestry

Cross Roads Independent School District
Grades 5-8
Boy Scout camp used for camping and nature study

Dickinson Independent School District
Field biology
Oceanography
60 acres of unused school site

Flour Bluff Independent School District
Travel tour, camp sessions, field trips, multidisciplinary approach

---

*Identified in a Texas Education Agency survey of all school districts, November 1973.

Fort Davis Independent School District
Science K-12
Study local fauna and flora, ecology, conservation

Fort Worth Independent School District
Outdoor studies, grade 5
Outdoor learning center
Pioneer life, nature crafts, gardening, conservation

Graham Independent School District
Science 1-6
About four acres, trails developed
Study plants, wildlife, rocks, and history

Hale Center Independent School District
Science K-12
Plant and animal study

Hamilton Independent School District
Undisturbed lake area
Plant and animal life, ecology

Houston Independent School District
Berry Elementary School, K-6

Houston Independent School District
Lantrip Elementary School, 4-6
Outdoor and gardening projects

Hurst-Euless-Bedford Independent School District
Elementary
Biology-ecology

Immanuel Lutheran School
Houston, Texas
Seventh grade subject areas

Jacksboro Independent School District
Conservation and ecology K-12
Taxonomy, plant and animal management 9-12
Ft. Richardson State Park

Jim Hogg County Independent School District
Science, language arts, mathematics, special education
250-foot site adjoining campus

The Kinkaid School, Houston
Science-ecology, grades 6-7
40 acres wooded site with bayou
Nature study

Lamar Consolidated Independent School District
Fifth grade science classes

Lasara Independent School District
Grades 5-8
Padre Island and school campus site

Lefors Independent School District
All subjects K-6
30-40 acres private ranch land

Lubbock Independent School District
All subject areas K-6
Outdoor classroom

McAdoo Independent School District
All science courses
Exploring fauna and flora, studying rocks of local region

McAllen Independent School District
Pre-vocational training
Science of horticulture
25 acres in Rio Grande Valley

McKinney Independent School District
Museum tours, nature trails, wildlife, natural history

Moody State School
Horticulture
Pre-vocational technology
Learn various skills in planting, growing household plants and vegetables

Pampa Independent School District
Science 4-6 and 8-9

Plano Independent School District
Grades 5, 6, 8
Gaddard Youth Camp

St. Mark's School, Dallas
Environmental studies
Use of both public and private sites

San Antonio Independent School District
Varies with grade level
Use of parks, YMCA, and scouting facilities

San Jacinto Elementary School
Galveston Independent School District
Grades K-5
Outdoor education studies

St. Mary's Hall, San Antonio
Study nature area of campus
Survey, camping, hiking, survival study

Sinton Independent School District
Science 7-8

Somerville Independent School District
Science and social studies K-4
School campus site
Plant and animal study

Spring Branch Independent School District
Grades 3, 4, 5, 8
Ecology, environmental studies

Texas Department of Mental Health and Mental Retardation
All levels
Camping

Texline Independent School District
K-12, science and history
Site located at creek
Nature trails

Tyler Independent School District
Grades 5-6, all subject areas
300 acres on camp site and farm

Vega Independent School District
All areas K-12
Planting trees, communitywide organization

Weatherford Independent School District
Elementary, all subjects
Middle school, social studies and science
High school, science
Nature trails

Wichita Falls Independent School District
Wooded area near Red River
Conservation, ecology

Wildorado Independent School District
Social studies, science
Use of state parks and private land
Nature studies

XI. AGENCIES REPRESENTED ON TEXAS ADVISORY COMMITTEE ON CONSERVATION AND ENVIRONMENTAL EDUCATION

Alice Independent School District

Education Service Center, Region IV

Education Service Center, Region V

Governor's Office

Harris County Department of Education

Southwest Texas State University

State Soil Conservation Board

Texas A&I University

Texas A&M University

Texas Air Control Board

Texas Bureau of Economic Geology

Texas Education Agency

Texas Forest Service

Texas Mid-Continent Oil & Gas Association

Texas Parks & Wildlife Department

Texas State Health Department

Texas Water Development Board

Texas Water Quality Board

United States Department of Agriculture

United States Geological Survey